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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,348	08/11/2006	Eiichi Shimizu	1592-0164PUS1	8171
2292 7590 10/30/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
KACKAR, RAM N				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
10/30/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

# Office Action Summary

**Application No.**

10/589,348

**Applicant(s)**

SHIMIZU ET AL.

**Examiner**

Ram N. Kackar

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**2. Claims 1-4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lei et al (US 6494955).**

Lei et al teach a CVD apparatus with a gas supply member;

A heating member (Fig 2A 234);

Heat uniformizing member (210);

Wafer containing member fixed between the susceptor and the semi-conductor substrate and having a dome-shaped recess (230). Lei et al teach that the configuration of this recess is correlated to the temperature distribution of the substrate (Col 4 lines 26-34).

It is obvious that the ratio of height and diameter of the recess would be an optimizable feature. The temperature profile at the substrate gets modified by varying thermal conductance between the susceptor (uniformizing member 11) and the substrate.

Regarding the recess portion being depressed in a dome shape at a back side of the wafer it is noted that the recess is dome shaped according to the plurality of stepped surfaces with varying depth. Further maximum depth is .003 and considering a standard 300 mm substrate the ratio will be in the claimed range.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gurary et al (US 6001183).**

Gurary et al teach a deposition apparatus with,  
Heating assembly (20), wafer containing member 24 and a susceptor (uniformizing member 14 and gas for deposition (Fig 1 and Col 1 line 43 to Col 2 line 9).

Gurary et al teach different shapes of the gap for improved uniformity of temperature (See Fig 14, Fig 15 and 16) including dome shaped gap (See Col 13 line 20 to Col 15 line 42).

Gurary et al teach that by optimizing the gap and the thickness of material at wafer holding member and or susceptor thermal conductivity is controlled to compensate for non uniformity caused at different regions by non uniform heat transfer.

Regarding H/D ratio, it appears to be in the claimed range according to dimensions disclosed in different embodiments. Further, the dimensions could be optimized to compensate for non uniform loss of heat from the wafer through supporting structure.

**5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art (AAPA) in view of Yoshiyuki Kamata et al (JP 06124901) as evidenced by Eiichi Shimizu (WO 2003/107403).**

AAPA disclose all limitations of these claims except a recess portion depressed in a dome shape at a back side of the wafer containing member so that an apex of the dome shape is arranged on a straight line connecting a center of the wafer containing member with a center of the heating uniformizing member.

Yoshiyuki et al teach a MOCVD apparatus which heats a semi-conductor substrate by the induction-heating method with a quartz spacer (wafer containing member 10) fixed between the susceptor and the semi-conductor substrate and having a dome-shaped recess (Fig.10 - 10b). Yoshiyuki et al teach that the configuration of this spacer is correlated to the temperature distribution of the substrate. Therefore the ratio of height and diameter of the recess would be an optimizable feature. The temperature profile at the substrate gets modified by varying thermal conductance between the susceptor (uniformizing member 11). This is consistent with the teaching of Eiichi Shimizu (Abstract).

Yoshiyuki et al teach the height of wafer containing member to be 2.6-3 mm. It can be seen from this that the H/D ratio falls within claimed range.

Thus, it would have been obvious to one of ordinary skill in the art at the time applicant's claimed invention was made to have provided the ratio of the height and the diameter H/D is between 0.01 and 2.10% and the ratio of the height and the diameter H/D is between 0.50 and 1.50% in order to form a thin film on the surface of a semi-conductor substrate and achieve uniform surface temperature as taught by Yoshiyuki et al.

**6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art (AAPA) in view of Bader et al (US 20040187790).**

AAPA disclose all limitations of these claims except a recess portion depressed in a dome shape at a back side of the wafer containing member so that an apex of the dome shape is arranged on a straight line connecting a center of the wafer containing member with a center of the heating uniformizing member.

Bader et al teach a deposition apparatus with,

Heating assembly, wafer containing member and a susceptor with varying configuration of space as in Fig 6A, 6C, 8A and 8B for the purpose of uniform temperature distribution by compensating spatial thermal transfer utilizing varying thickness of recess including dome like structure as in Fig 8B.

Regarding H/D ratio, it appears to be in the claimed range according to dimensions disclosed in different embodiments. Further, the dimensions could be optimized to compensate for non uniform loss of heat from the wafer through supporting structure.

***Response to Arguments***

Applicant's arguments filed 7/11/2008 have been fully considered but they are moot in view of the present grounds of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1792

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ram N Kackar/

Primary Examiner, Art Unit 1792